
Gospodinjski in podobni električni aparati - Varnost - 2-77. del: Posebne zahteve za ročno vodene električne vrtno kosilnice (IEC 60335-2-77:1996, spremenjen)

Household and similar electrical appliances - Safety - Part 2-77: Particular requirements for pedestrian controlled mains-operated lawnmowers (IEC 60335-2-77:1996, modified)

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English version

**Household and similar electrical appliances -
Safety
Part 2-77: Particular requirements for pedestrian controlled
mains-operated lawnmowers
(IEC 60335-2-77:1996, modified)**

Appareils électrodomestiques
et analogues -
Sécurité
Partie 2-77: Règles particulières
pour les tondeuses à gazon fonctionnant
sur le réseau et à conducteur à pied
(CEI 60335-2-77:1996, modifiée)

Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke
Teil 2-77: Besondere Anforderungen für
handgeführte netzbetriebene Rasenmäher
(IEC 60335-2-77:1996, modifiziert)

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This European Standard was approved by CENELEC on 2005-09-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of EN 60335-2-77:2000 (IEC 60335-2-77:1996, modified) has been revised by WG 5, Gardening appliances, of the Technical Committee CENELEC TC 61F, Safety of hand-held and transportable motor-operated electric tools, with the aim to delete the non-electrical requirements and to refer in that case to EN 836. In addition this standard has been brought in line with EN 60335-1:2002. A first draft was submitted to the Unique Acceptance Procedure in December 2003.

A second draft was submitted to the formal vote and was approved by CENELEC as EN 60335-2-77 on 2005-09-01.

This European Standard supersedes EN 60335-2-77:2000 + corrigendum December 2000.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2006-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2008-09-01

In this European Standard the common modifications to the International Standard are indicated by a vertical line in the left margin of the text.

This standard has to be used in conjunction with EN 60335-1, Safety of household and similar electrical appliances - Part 1: General requirements, and EN 836, Garden equipment - Powered lawnmowers - Safety.

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This Part 2 supplements or modifies the corresponding clauses of EN 60335-1, so as to convert it into the European Standard: Household and similar electrical appliances - Safety - Particular requirements for pedestrian-controlled mains-operated lawn-mowers.

When a particular subclause of Part 1 is not mentioned in this Part 2, that subclause applies as far as is reasonable. When this standard states “addition”, “modification” or “replacement”, the relevant text of Part 1 is to be adapted accordingly.

This European Standard has been prepared under a mandate given to CEN and CENELEC by the European Commission and the European Free Trade Association and supports the essential health and safety requirements of the Machinery Directive. See Annex ZZ.

Other harmonised standards referred to this European Standard are listed in Annex ZC of Part 1 and this part. The annex lists the valid edition of those documents at the time of issue of this EN. All references are however to be understood as references to the latest edition.

NOTE 1 The following numbering system is used

- subclauses, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- unless notes are in a new subclause or involve notes in Part 1, they are numbered starting from 101, including those in a replaced clause or subclause;
- additional annexes are lettered AA, BB, etc.;
- subclauses, figures and annexes that are additional to those in the IEC standard are prefixed with the letter Z.

NOTE 2 In this standard the following print types are used:

- Requirements proper;
- *Test specifications*
- Explanatory matter.

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1 Scope

This clause of Part 1 is replaced by:

This European Standard specifies safety requirements and their verification for the design and construction of pedestrian controlled mains-operated electrical cylinder or rotary lawnmowers with a rated voltage being not more than 250 V single phase.

This standard does not apply to lawn trimmers, lawn edge trimmers, lawn edgers, fail mowers, sickle-bar mowers or agricultural mowers.

This standard is not applicable to rotary lawnmowers for which the cutting means is a generally circular central drive unit on which is mounted, either one or more non-metallic filaments or one or more non-metallic, pivotally mounted cutting elements. These cutting elements rely on centrifugal force to achieve cutting, with the kinetic energy of a single cutting element not exceeding 10 J.

This document is not applicable to pedestrian controlled mains operated lawnmowers which are manufactured before the date of publication of this document by CENELEC.

This standard does not in general take into account

- the use of appliances by young children or infirm persons without supervision,
- playing with the appliance by young children.

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2 Normative references

[SIST EN 60335-2-77:2006](https://standards.iteh.ai/standards/sist/a8799ec4-f0f0-433e-8746-90a07b9af5da/sist-en-60335-2-77-2006)

This clause of Part 1 is applicable except as follows.

Addition:

EN 836, Garden equipment – Powered lawnmowers – Safety

EN ISO 12100-1, Safety of Machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology

EN ISO 12100-2, Safety of Machinery – Basic concepts, general principles for design – Part 2: Technical principles

3 Definitions

This clause of Part 1 is applicable except as follows.

3.1.9 Replacement:

normal operation

operation of the appliance under the following conditions: the appliance is operated at rated voltage with the load necessary to attain rated power input

3.Z101 The definitions of EN 836, Clause 3, apply, except for any definitions which are specifically for combustion engine driven machines.

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows:

5.5 Addition:

During the tests the cutting means are adjusted and lubricated in accordance with the manufacturer's instructions specific to the test.

NOTE For example, cylinder mower cutting means may not be able to run for extended periods at normal adjustment because of lack of lubrication etc. normally provided by the grass.

5.6 Addition:

Electronic speed control devices are set for the highest speed.

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6 Classification

This clause of Part 1 is applicable except as follows.

6.1 Replacement:

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Appliances shall be of one of the following classes with respect to protection against electric shock:

- class II or class III.

Compliance is checked by inspection and by the relevant tests.

6.2 Addition:

Appliances shall be at least IPX4.

7 Marking and instructions

This clause of Part 1 is applicable except as follows.

7.1 Addition:

The machines shall be marked with the following minimum information:

- year of construction;
- controls, whose purpose is not obvious to the user, shall have the function, direction and/or method of operation clearly identified;
- mass in kilograms (if over 25 kg).

The requirements of EN 836, Subclause 5.2.2, apply, except for any requirements which are specifically for combustion engine driven machines.

The substance of the following warning shall be placed in a prominent position on the machine. If a pictogram is used it shall be that shown in Annex ZAA. It shall be in contrasting colours to the base material. If it is embossed, stamped or cast colours are not required. Markings or symbols giving cautionary information shall be located close to the hazard.

WARNING: Beware of sharp blades. Blades continue to rotate after the motor is switched off –
Remove plug from mains before maintenance or if cord is damaged.
Keep the supply flexible cord away from the blades.

7.12 Replacement:

An instruction sheet shall be supplied with the appliance.

These instructions shall include

- a) the requirements of EN 836, Subclause 5.1, except for any requirements which are specifically for combustion engine driven machines;
- b) a repeat of all the information presented on the machine symbols and an explanation of its meaning;
- c) at least the sense of and in proper order the following instructions for preparation, safe use, operation and maintenance of the machine:
 - when and how to check the supply and extension cord for signs of damage or ageing,
 - instructions on how to disconnect the mains from the cord if it becomes damaged during use,
 - instructions where to inspect the machine for damage and how to make repairs. In case of abnormal vibration, instructions how to proceed,
 - information on how to start the machine safely, especially with a view to necessary tilting of the machine and keeping both hands in the operating position before returning the machine to the ground,
 - when and how to replace safety parts subjected to regular wear and tear;
- d) the following warnings:
 - Not to use the lawnmower if the cords are damaged or worn.
 - Not to connect a damaged cord to the supply or touch a damaged cord before it is disconnected from the supply. A damaged cord can lead to contact with live parts.
 - Not to touch the blades before the machine is disconnected from the supply and the blades have come to a complete stop.
 - To keep extension cords away from the blades. The blades can cause damage to the cords and lead to contact with live parts.

- To disconnect the supply (i.e. pulling the plug from the socket)
 - whenever leaving the machine unattended,
 - before clearing a blockage,
 - before checking, cleaning or working on the machine,
 - after striking a foreign object,
 - whenever the machine starts vibrating abnormally.
- e) to carefully read the instructions for the safe operation of the machine;
- f) Recommendations:
 - to connect the machine only to a supply circuit protected by a residual current device (RCD) with a tripping current of not more than 30 mA.

8 Protection against access to live parts

This clause of Part 1 is applicable except as follows:

8.2 Addition:

For class II rotary mowers access to the surface of basic insulation or metal parts separated from live parts by basic insulation shall be permitted when the cutting means is removed if a tool is required for its removal.

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9 Starting of motor-operated appliances

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Motors shall start under all normal voltage conditions that may occur in use.

Centrifugal and other automatic starting switches shall operate reliably and without contact chattering.

Compliance is checked by starting the appliance three times, at no-load, at a voltage equal to 0,85 times rated voltage or the lower limit of the rated voltage range, with any control device set at maximum speed.

For the test the cutting means are adjusted according to the manufacturer's instructions related to this test.

The appliance shall operate in such a way that safety is not affected.

10 Power input and current

This clause of Part 1 is applicable except as follows.

10.1 Not applicable.

11 Heating

This clause of Part 1 is applicable except as follows:

11.5 Addition:

The machine shall be operated at rated voltage and rated current or rated power input until a steady state is reached. The torque being applied shall be measured. When tested by 0,94 and 1,06 times rated voltage the previously determined torque shall be maintained.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable except as follows.

15.2 Addition:

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~~Appliances fitted with an appliance inlet or cable coupler shall be tested with the appropriate mating connector in place.~~

Air filters are not removed.

16 Leakage current and electric strength

This clause of Part 1 is applicable.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is applicable except as follows.

18.101 Appliances shall be so constructed that, in normal use, there will be no electrical or mechanical failure that might impair compliance with this standard. The insulation shall not be damaged, and contacts and connections shall not have worked loose as a result of heating, vibration, etc.

Moreover, overload devices shall not operate under normal running conditions.

Compliance is checked by the tests of 18.102.

18.102 *The appliance is operated at no load, series motors being supplied at a voltage such that the rotating speed is the same as that obtained at rated voltage and under normal operation. The appliance is operated for 48 h, reduced by the running time necessary for the tests of Clauses 11 and 13.*

Appliances are operated continuously, or for a corresponding number of periods, each period being not less than 8 h.

During the test, replacement of carbon brushes is allowed and the appliance is lubricated as in normal use.

18.103 During the tests of 18.102, overload protective devices shall not operate.

After the tests of 18.102 the appliance shall withstand the tests of Clause 16. Connections, handles, guards, brush-caps and other fittings or components shall not have worked loose, and there shall be no deterioration impairing safety.

19 Abnormal operation

This clause of Part 1 is applicable except as follows:

19.7 Addition:

This test is not made on appliances with flexible or freely pivoting cutting means mounted on a generally circular drive unit.

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19.9 Not applicable.

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20 Stability and mechanical hazards

This clause of Part 1 is replaced by Subclauses 4.1 to 4.2.2.3, 4.2.2.6 and 4.2.3 to 4.3 of EN 836, except for any requirements which are specifically for combustion engine driven machines.

21 Mechanical strength

This clause of Part 1 is applicable except as follows.

Modification:

The impact energy shall be 1,0 J ± 0,05 J.

21.Z101 The requirements of EN 836, Subclauses 4.2.2.4, 4.2.2.5 and 4.2.2.7 apply, except for any requirements which are specifically for combustion engine driven machines.

22 Construction

This clause of Part 1 is applicable except as follows.

22.6 Addition:

Any drain holes provided to prevent accumulation of water in an enclosure shall be at least 5 mm in diameter or 20 mm² in area with a width of at least 3 mm.

Compliance is checked by inspection.

22.35 Replacement:

For class II appliances:

Handles and operator controls which are hand-held when operating the appliance shall either be of insulating material or covered by insulating material having a thickness of at least 1 mm, or separated by insulation equivalent to supplementary insulation from other accessible metal parts.

Handle shafts shall be

- a) of insulating material or,
- b) if not of insulating material, covered with insulating material having a thickness of at least 1 mm which extends for a distance of 150 mm from handles and handle mounted operator controls and by insulation equivalent to supplementary insulation from other accessible metal parts which are within 75 mm of the ground measured as a clearance or from accessible metal parts connected to such parts.

Cable restraints/guides are not considered to be operator controls.

For rotary mowers, the cutting means shall be insulated from other parts, which are accessible when the machine is in its normal position of use, by insulating material equivalent to supplementary insulation.

Compliance is checked by inspection, by measurement and, for the covering of insulating material on handles, operator controls and handle shafts, by the following tests.

A sample of the covered part is conditioned at a temperature of (70 ± 2) °C for 7 days (168 h). After conditioning, the sample is allowed to attain approximately room temperature.

Inspection shall show that the covering has not shrunk to such an extent that the required length of 150 mm or the required insulation is no longer given, or that the covering has not peeled off and that it may move longitudinally.

After this, the sample is maintained for 4 h at a temperature of (-10 ± 2) °C.

While still at this temperature, the sample is then subjected to impact by means of the apparatus shown in Figure Z101. The weight A having a mass of 300 g falls from a height of 350 mm onto the chisel B of hardened steel, the edge of which is placed on the sample.

One impact is applied to each place where the covering is likely to be weak or damaged in intended use, the distance between the points of impact being at least 10 mm.

After this test, inspection shall show that the covering has not peeled off and an electric strength test is made between metal parts and metal foil wrapped round the covering in the area required to be insulated.

The test voltage of 1 750 V is applied for 1 min.

During this test, no flashover or breakdown shall occur.

22.36 This subclause does not apply.

22.101 Appliances shall be provided with a means such that damage to the supply cable due to movement of the appliance is prevented as far as possible. The means provided shall be re-usable.

This requirement is considered to be met by, for example,

- a cable-retaining device to keep the cable out of the vicinity of the cutting means, to which the cable may be adequately fastened, or
- the supply cable entry or attachment being at least 0,6 m from the nearest point of the cutting means.

Compliance is checked by inspection and by the following test procedure, except for automatic cord reel-in devices.

The supply cable as delivered with the appliance is attached to the device in accordance with the instruction manual. The supply cord is then subjected 10 times to a pull of 100 N, the pull being applied in the most unfavourable direction, without jerks, for 1 s.

After the test the power supply cord shall show no damage within the meaning of this standard and it shall not have been displaced longitudinally, in the device, by more than 2 mm.

22.102 Air filters which can be removed for cleaning purposes shall be so designed that they are unlikely to come off during use.

This requirement is met if, for example, the air filter

- can only be removed with the aid of a tool, or
- is provided with a spring that prevents it from falling away, during use, due to vibration, or
- needs a deliberate action of the user for its removal.

Compliance is checked by inspection.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows.

24.1.3 Addition:

Switches shall have a contact separation in all poles and shall have a contact separation of at least 3 mm.

Switches shall have been satisfactorily tested for at least 50 000 operations.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows.

25.1 Replacement:

Appliances shall be provided with a supply cord or an appliance inlet.

Appliance inlets and couplers shall not allow the introduction of a connector complying with the standard sheets of EN 60320 except EN 60320-2-3.

25.5 Replacement:

Appliances shall be provided with one of the following:

- a supply cord not less than 10 m in length with type X attachment, or
- a supply cord of length not exceeding 0,5 m with type X or Y attachment and terminating in a cable coupler or,
- an appliance inlet.

25.7 Modification:

Replace the first paragraph by:

Supply cords shall not be lighter than

- if rubber insulated, ordinary polychloroprene sheathed flexible cord (code designation H05 RN-F);
- if polyvinyl chloride insulated, ordinary polyvinyl chloride sheathed flexible cord (code designation H05 VV-F);

25.14 Addition:

This requirement also applies to external cables or cords where, because of the design of the appliance, there is relative movement of more than 45° of the cable or cord at its point of entry into an enclosure.

25.15 Addition:

This requirement applies to all accessible cables or cords.

Replacement of the fourth paragraph:

A mark shall be made on the cord on the appliance side of the cord anchorage while it is subject to the pull force shown in Table 12, at a distance of approximately 2 cm from the cord anchorage or other suitable point. If access to the appliance side of the cord anchorage is not practicable then the mark shall be made on the supply side of the anchorage and it shall be ensured that the pull force is applied to the cord in such a way that, at the point of application of the force, the sheath of the cord does not move with respect to the conductors or their insulation.

Modification:

The test is modified as follows:

The pull force on the supply cord shall be 150 N.

25.Z101 If the appliance is delivered with an extension cord, which can also be used with other machines, the extension cord shall be marked with the maximum rated current or power.

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is applicable.

28 Screws and connections

This clause of Part 1 is applicable.

29 Clearances, creepage distances and solid insulation

This clause of Part 1 is applicable.

30 Resistance to heat and fire

This clause of Part 1 is applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is not applicable.

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